METHOD AND APPARATUS FOR USING INTERVAL TECHNIQUES TO SOLVE A MULTI-OBJECTIVE OPTIMIZATION PROBLEM

ABSTRACT

One embodiment of the present invention provides a system that uses interval techniques to solve a multi-objective optimization problem. During operation, the system receives a representation of multiple objective functions $(f_1, ..., f_n)$ at a computer system, wherein $(f_1, ..., f_n)$ are scalar functions of a vector $x = (x_1, ..., x_n)$. The system also receives a representation of a domain of interest for the multiple objective functions. Next, the system performs an interval optimization process to compute guaranteed bounds on a Pareto front for the objective functions $(f_1, ..., f_n)$, wherein for each point on the Pareto front, an improvement in one objective function cannot be made without adversely affecting at least one other objective function. While performing the interval optimization process, the system applies a direct-comparison technique between subdomains of the domain of interest to eliminate subdomains that are certainly dominated by other subdomains.

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